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MENTAL SCIENCE.

The Rivalry of Mental Impressions.

WHENEVER two or more impressions are presented to the mind at the same time, there results a rivalry between them in attracting the attention and getting into the focus of consciousness. Usually the attention is divided between them, though this flitting of the attention is at times so rapid and so unconscious that we hesitate to believe that it has really taken place. If the one process is automatic in character, or nearly so, the interference is reduced to a minimum. When both processes are voluntary, mutual interference is inevitable; and its extent will depend upon the complexity and other characteristics of the task, and will doubtless vary, too, with each individual. Some simple experiments in this field by M. Binet, though they hardly do more than open out the possibilities of research in this direction, may be here recounted for their general interest and suggestiveness. The subject of the experiment is asked to take hold of a rubber bulb connected by means of a tube with a recording apparatus consisting of a point raised and lowered by the air-pressure within the tube, and writing upon a smoked surface fastened to a rotating drum. He is required to press this bulb once a second, and the result is a tracing on the smoked surface showing very regular curves. With this is compared the tracing produced when at the same time he is required to perform some simple mental exercise, such as reading aloud, adding or multiplying numbers, and the like. The most usual result is that the intervals between the pressures are lengthened, with some persons only slightly, with others more noticeably; and in some cases the pressures even cease altogether for a brief period. Very frequently, too, the movements are less forcible, so that the curves are not as high as normally. Again, let the subject be told to make a series of five pressures, then allow a second's interval and begin another series of five; and so on. This is done very constantly and regularly; but, if the subject performs another task at the same time, we have, in addition to the other irregularities, an irregularity in the number of pressures in a series, sometimes only four, and sometimes six. Sometimes the interval is neglected or two pressures overlap, and in every way the mental friction and inco-ordination is shown. The pressure upon the rubber tube, in turn, interferes with the mental task, although this cannot be so accurately noted. The addition of simple numbers takes considerably longer than normally, and the result is often wrong. M. Binet notices, too, that the pressures soon get to be done subconsciously, the subject not knowing at the end of the experiment whether he has made an error, or has written irregular curves or not. The pressures thus become more or less unconscious while still remaining voluntary. It is interesting to note, that, if the pressure be done by both hands, the errors and irregularities are the same. If, for example, the one hand presses four times instead of five, while its owner is engaged in some mental task, the left, pressing at the same time, will also write four instead of five curves, thus indicating that one volition brings about both actions. The degree of interference depends upon the nature of the two tasks; and if we keep the one task the same, and vary the other, we have a kind of test of the power of an individual to do two things at once. It was found that some subjects could perform simple additions and keep up a series of two pressures in a second, but not with more than two; others could keep up as many as five in a series. But all these actions are extremely fatiguing, and some individuals refused to go on with them on account of the headaches they are apt to produce.

A different aspect of this interference is revealed when the two hands attempt to make two different movements at the same time. In all such cases there is great mutual interference, not alone because the two tasks are closely similar, and so employ allied brain-centres, but especially because the movements of the two hands are subject to a special co-ordination, and their disassociation is proportionately difficult. If one hand attempts to draw curves and the other straight lines, the curves will be somewhat straightened out, and the straight lines somewhat curved. If the one hand is to beat two beats to every five of the other, this may be done correctly for a time, but soon the two tend to beat the same number of times. If one hand attempts to write a sentence while the other draws circles, the writing and the circles will both materially suffer. All this when the two tasks are different: if the two hands make the same movement, they seem to aid each other, and especially does the preferred hand (right or left handedness) help the other.

M. Binet has studied another phase of the subject, introducing us to a quite different order of mental phenomena. If the attention, instead of being divided between the operations, is sharply concentrated upon one, we approach the case in which a person abstractedly does one thing while his attention is devoted to another, — an artificial absent-mindedness, which, as usual, implies an extreme "present-mindedness" in another direction. The subject is given something to read, and his one hand he is told not to consider at all. If the attention be sufficiently engrossed (and this can be done with only a few subjects), the hand will reproduce slight movements imparted to it by the operator in total unconsciousness of their origin. Such movements are spoken of as automatic movements. These are of a quite different character from the foregoing; for while there the two acts interfered with each other, and the more so the less intense the effort to produce them both, here the two acts do not interfere with each other, and are best performed when no conscious effort at all is made. This difference M. Binet